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- (71) Applicant: **PANACEA PHARMACEUTICALS, LLC**  
[US/US]; 640 Sasco Hill Road, Fairfield, CT 06430 (US).
- (72) Inventors: **SOSIN, Howard, B.**; 640 Sasco Hill Road, Fairfield, CT 06430 (US). **CAPLAN, Michael, J.**; 1217 Racebrook Road, Woodbridge, CT 06525 (US).
- (74) Agent: **MAH, Stanley, C.**; Choate, Hall & Stewart, Exchange Place, 53 State Street, Boston, MA 02109 (US).
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(54) Title: **IMMUNOSTIMULATORY NUCLEIC ACIDS AND ANTIGENS**

(57) Abstract: The present invention provides methods and compositions for modulating an individual's immune response to antigens. It is an aspect of the present invention that allergic responses to antigens, which in some cases lead to asthma and even anaphylaxis, can be treated or prevented by administering compositions having immunostimulatory oligonucleotides having unmethylated CpG sequences. It is another aspect of the present invention that allergies to antigens, especially one that result in asthma and anaphylaxis, can be treated or prevented by administering compositions containing immunostimulatory oligonucleotides having unmethylated CpG dinucleotide sequences and further comprising antigen(s), fragments of the antigen, mixtures of fragments of the antigen, antigens modified to reduce Th2-type immune responses, and fragments of the antigen modified to reduce Th2-type immune responses. Cellular systems for studying immunostimulation by CpG containing nucleic acids include *in vivo*, *in vitro* or *ex vivo* systems.

# INTERNATIONAL SEARCH REPORT

Internat. Application No.

PCT/US 00/07213

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61K39/35 A61K39/39 A61P37/04 A61K39/38

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

CHEM ABS Data, BIOSIS, EPO-Internal, PAJ, WPI Data, STRAND, MEDLINE

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KLINMAN DENNIS M ET AL: "CpG motifs as immune adjuvants." VACCINE, vol. 17, no. 1, January 1999 (1999-01), pages 19-25, XP004139028 ISSN: 0264-410X	1-3,8, 10-14, 19,21, 22,37
Y	abstract  page 19, column 1, last paragraph -column 2, paragraph 2 page 20, column 1, last paragraph page 22, column 1, last paragraph -column 2, paragraph 1 figure 3  ---  -/--	4-7, 15-18



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Noë, V

## INTERNATIONAL SEARCH REPORT

Internat. Application No.

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98 55495 A (DYNAVAX TECHNOLOGIES CORP ;DINA DINO (US); ROMAN MARK (US); SCHWAR) 10 December 1998 (1998-12-10) abstract page 4, line 24 - line 25 page 4, line 31 - line 34 page 5, line 1 - line 2 page 5, line 26 - line 29 page 10, line 5 - line 8 page 12, line 9 - line 16 page 13, line 21 - line 39 page 14, line 15 - line 20 page 14, line 27 -page 15, line 4 page 21, line 20 - line 26 claims 4,25,28,30,31,45,49,51; examples 3,5 ---	1,3,11, 12,15, 22,37
Y A	US 5 804 201 A (KING TE PIAO) 8 September 1998 (1998-09-08) abstract column 6, line 51 - line 60 column 8, line 58 - line 60 column 12, line 48 - line 51; table 2 column 13, line 58 - line 65 column 21, line 53 -column 22, line 9 column 27, line 41 -column 28, line 6 column 28, line 28 - line 31 column 28, line 49 - line 51 column 28, line 57 - line 67 ---	4-7, 15-18 36
A	KRIEG A M ET AL: "CPG MOTIFS IN BACTERIAL DNA TRIGGER DIRECT B-CELL ACTIVATION" NATURE,GB,MACMILLAN JOURNALS LTD. LONDON, vol. 374, 6 April 1995 (1995-04-06), pages 546-549, XP000197060 ISSN: 0028-0836 the whole document ---	1-37
A	WO 84 00110 A (MICHAEL J GABRIEL;PESCE AMADEO J) 19 January 1984 (1984-01-19) abstract page 3, line 8 - line 16 page 3, line 31 - line 35 page 5, line 16 - line 22 page 8, line 17 - line 32 page 9, line 6 - line 17 claims 15-21; examples 5,9-11,15-17 ---	
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# INTERNATIONAL SEARCH REPORT

Internal Application No  
PCT/US 00/07213

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>STANLEY J STEVEN ET AL: "Identification and mutational analysis of the immunodominant IgE binding epitopes of the major peanut allergen Ara h 2."</p> <p>ARCHIVES OF BIOCHEMISTRY AND BIOPHYSICS, vol. 342, no. 2, 1997, pages 244-253, XP000946317</p> <p>ISSN: 0003-9861</p> <p>the whole document -----</p>	<p>8-10, 19-21, 31-33</p>

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Information on patent family members

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